

# **Industrial Exposure and Control Technologies for OSHA Regulated Hazardous Substances**

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U.S. Department of Labor  
Elizabeth Dole, Secretary  
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Volume I of II  
Substances A-I

Occupational Safety and Health Administration  
John A. Pendergrass, Assistant Secretary

Chromium (metal)  
(CAS NUMBER: VARIES ACCORDING TO COMPOUND)

SYNONYMS

Chrome

TRADE NAMES

NONE

DESCRIPTION OF SUBSTANCE

Chromium is a hard, steel-gray, lustrous metal which reacts with dilute hydrochloric acid and sulfuric acid but not with nitric acid. Chromium can have a valence of 2,3, or 6, and a wide range of chromium alloys and inorganic chromium compounds are encountered in the workplace. These compounds vary greatly in their toxic and carcinogenic effects. This file deals only with chromium metal and chromium-containing alloys (e.g., stainless steel and ferrochrome); there are separate files in this data base for di- and trivalent chromium compounds and for hexavalent chromium compounds.

HEALTH EFFECTS

Chromium metal is relatively non-toxic. Exposure to ferrochrome alloys has been reported to cause decreased pulmonary function in humans. Four workers engaged in the production of ferrochrome alloys developed a nodular type pulmonary disease with impairment of pulmonary function; air concentrations of chromium averaged 0.26 mg/m<sup>3</sup>, although other dusts and fumes were also present. [PROCTOR AND HUGHES, P. 175, 1978]  
Exposure to chromium metal does not give rise to pulmonary fibrosis or pneumoconiosis. [ACGIH, P. 139, 1986]  
% of those exposed 3-10 yr, 69.6% of those exposed

TOXICITY/EXPOSURE LIMITS

NFPA RATING - NONE

TOXICITY HAZARD RATING - NONE

IMMEDIATELY DANGEROUS TO LIFE OR HEALTH - NONE

OSHA PEL - \*\*\*\*\* ppm, 1.000 mg/m<sup>3</sup>;TWA

ADOPTED ACGIH/TLV - 0.500 mg/m<sup>3</sup>;TWA

NIOSH/REL - NONE

#### INDUSTRY USE DATA

Chromium metal is used to manufacture stainless and heat-resisting steel and alloy steel. Chromium and its compounds are also used in refractories, drilling muds, the production of chromic acid and specialty chemicals; as a constituent of inorganic pigments, a sensitizer in the photographic industry, electroplating cleaning agents in the metal finishing industry, mordants in the textile industry; in nuclear and high-temperature research, in catalytic manufacture, and in fungicides and wood preservatives.

#### NIOSH 1982 NATIONAL OCCUPATIONAL EXPOSURE SURVEY

SIC CODE	INDUSTRY NAME	TOTAL ON PAYROLL	TOTAL EXPOSED	PERCENT EXPOSED
3324	STEEL INVESTMENT FOUNDRIES	527	96	18.22

#### NIOSH 1972 NATIONAL OCCUPATIONAL HAZARD SURVEY

NONE

#### OSHA/EXPOSURE DATA

NONE

#### ENGINEERING CONTROLS

General ventilation; local exhaust ventilation; hood; enclosure of process or worker.

#### PERSONAL PROTECTIVE EQUIPMENT

Respiratory protection should be as follows: Up to 2.5 mg/m<sup>3</sup>: any dust and mist respirator except single-use respirators. Substance reported to cause eye irritation or damage; may require eye protection. Up to 5 mg/m<sup>3</sup>: any dust and mist respirator except single-use and quarter-mask respirators or supplied air respirator or self-contained breathing apparatus. Substance reported to cause eye irritation or damage; may require eye protection. Up to 12.5 mg/m<sup>3</sup>: any powered air-purifying respirator with dust and mist filter; or any supplied-air respirator operated in a continuous flow mode. Substance reported to cause eye irritation or damage; may require eye protection. Up to 25 mg/m<sup>3</sup>: any air-purifying respirator with a high efficiency particulate filter or any powered air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter. Substance reported to cause eye irritation or damage; may require eye protection. Any self-contained breathing apparatus with a full facepiece or any supplied-air respirator with a full facepiece. Up to 500 mg/m<sup>3</sup>: any supplied-air respirator with a full facepiece and operated

in a pressure-demand or other positive pressure mode. Emergency or planned entry in unknown concentration or IDLH conditions: any self-contained breathing apparatus with full facepiece and operated in a pressure-demand or other positive pressure mode or any supplied-air respirator with a full facepiece and operated in pressure-demand or other positive pressure mode in combination with an auxiliary self-contained breathing apparatus and operated in pressure-demand or other positive pressure mode. Escape: any air-purifying full facepiece respirator with a high-efficiency particulate filter or any appropriate escape-type self-contained breathing apparatus. [NIOSH: POCKET GUIDE TO CHEMICAL HAZARDS P. 83 (1987) DHEW (NIOSH) PUB NO. 85-114]

**STORAGE**

NONE